Claims:

1. A photoacoustic detector, comprising at least
- a first chamber (V_0) suppliable with a gas to be analyzed,
- a window for letting modulated and/or pulsed infrared radiation and/or light in the first chamber (V_0), and
- means for detecting pressure variations created in the first chamber by absorbed infrared radiation and/or light, **characterized** in that the means for detecting pressure variations created in the first chamber by absorbed infrared radiation and/or light comprise at least
- an aperture provided in the wall of the first chamber (V_0), in communication with which is provided a door adapted to be movable in response to the movement of a gas, and
- means for a contactless measurement of the door movement.

2. A photoacoustic detector as set forth in claim 1, **characterized** in that the door has a surface area which is at most equal to that of the aperture provided in the first chamber (V_0).

3. A photoacoustic detector as set forth in claim 1 or 2, **characterized** in that the door is at least by one side mounted on a frame structure encircling the side faces of the door.

4. A photoacoustic detector as set forth in any of the preceding claims, **characterized** in that the door and the frame are fabricated from silicon.

5. A photoacoustic detector as set forth in any of the preceding claims, **characterized** in that the means for a contactless measurement of the door movement comprise:
- an optical measuring system, comprising at least one or more light sources for illuminating the door or a part thereof and one or more detectors for receiving light reflected from the door and for measuring the door movement as optical angular and/or translatory measurement, or
- a capacitive measuring system, whereby the door or a part thereof is coated with a metal or the door is fabricated from an electrically highly conductive material, and said measuring system comprising a metal film or a metal-coated diaphragm set in the proximity of the door, as well as means for measuring the capacitance variations of a capacitor established by the door and the metal film.

6. A photoacoustic detector as set forth in claim 5, **characterized** in that the light source of the measuring system comprises a laser.

7. A photoacoustic detector as set forth in claim 5 or 6, **characterized** in that the detector of the measuring system comprises a double sensor.

8. A photoacoustic detector as set forth in any of claims 5-7, **characterized** in that the light source and the detector are designed as a part of an interferometer.

9. A photoacoustic detector as set forth in any of claims 5-8, **characterized** in that the means of a contactless measurement of the door movement are provided in a second chamber (V), which constitutes a measuring space with a volume V and which is in communication with the first chamber by way of the first chamber's aperture.

10. A photoacoustic detector as set forth in claim 9, **characterized** in that in communication with the second chamber is further provided a third chamber which is identical to the first chamber in terms of size and has an aperture which is identical to that included in the first chamber and connects the third chamber with the second chamber, said aperture of the third chamber being closed with a door similar to that closing the aperture of the first chamber, the movement of said door being measured in a manner similar to that used for measuring the movement of the door closing the first chamber aperture, as well as means for calculating the amplitudes of an actual measuring signal measured from the sensor arranged in the first chamber aperture and a reference signal measured from the sensor arranged in the third chamber aperture, and for working out a difference therebetween.

11. A sensor for a photoacoustic detector, **characterized** in that the sensor comprises a panel-like skirt element serving as a door frame, and a door separated from the panel-like skirt element by means of a gap.

12. A sensor as set forth in claim 11, **characterized** in that the sensor is arrangeable in communication with a chamber included in a photoacoustic detector and containing a gas to be analyzed, such that the door is moved by pressure variations created in the chamber by absorbed infrared radiation and/or light.

13. A sensor as set forth in claim 11 or 12, **characterized** in that the sensor does not comprise sensors fixedly mounted thereon and/or fixedly arranged in communication therewith for detecting and/or measuring the door movement.

14. A method in the optimization of a door used as a sensor for a photoacoustic detector, **characterized** in that the optimization of the amplitude of a door movement is implemented by applying the optimization equation:

$$A_x(\omega) \approx \frac{p_0 \Delta T/T_0}{\rho d \omega_0^2 + \frac{p_0 A}{2V_0}}, \qquad \text{when } \omega < \omega_0$$

$$A_x(\omega) \approx \frac{p_0 \Delta T/T_0}{\rho d \omega^2 + \frac{p_0 A}{2V_0}}, \qquad \text{when } \omega > \omega_0$$

15. A method as set forth in claim 14, **characterized** in that optimization of the amplitude $A_x(\omega)$ is effected by means of ω_0, A and d, especially by striving to reduce the values thereof.